

writings and the absurdly easy-going way in which many physiologists deal with that adaptiveness of response which is the very essence of life.

The kernel of the book is to be found in chapters vi. and vii. of the second part, but the kernel is surrounded by a hard stone. These two chapters (which Driesch says "ich ganz besonders als mein Eigenthum ansehe") contain an analytic discussion of "form-regulations," an excursus on the problem of heredity and an exposition of the two proofs of the autonomy of vital processes. Evidences of the falsity of Weismann's theory of development and theory of heredity—both of which Driesch condemns as hopelessly materialistic—are thrown in. The differentiation of harmoniously-equipotential systems is the one foundation of "vitalism"; the existence and genesis of equipotential systems with complex potencies is the other. Whether we study the development of a sea-urchin ovum or the growth of a Tubularian fragment, or regeneration in Planarians, or the potencies of cambium, we are brought face to face with regulative phenomena which put the most elaborate "machine-theory" of life out of court and lead us to recognise "the autonomy of vital processes." So far as we understand, it simply comes to this, that the formulæ of chemistry and physics, as at present conceived, seem quite inadequate for the scientific interpretation of the facts of life.

J. ARTHUR THOMSON.

AN INDIAN POCKET-FLORA.

Forest Flora of the School Circle, N.-W.P. Being a Descriptive List of the Indigenous Woody Plants of the Saharanpur and Dehra Dún Districts and the Adjoining Portion of the Tehri-Garhwal State in the North-Western Provinces, with Analyses. Compiled for the Use of the Students of the Imperial Forest School, Dehra Dún, by Upendranath Kanjilal, Extra-Assistant Conservator of Forests. (Calcutta: Office of the Superintendent of Government Printing, India, 1901.) Price 2s.

"I BELIEVE this to be the first botanical work of any importance which has ever been prepared by a native of India, and the Imperial Forest School may well be proud of having educated at least one native gentleman who has taken up botany as a study and botanical work as a labour of love." So writes Mr. J. S. Gamble in his introduction to this useful pocket-flora, which is designed for the use of Indian students of forestry.

Following upon this introduction, in succession are the author's preface, a brief glossary of botanical terms, a general analytical table of the Phanerogamia, an analytical key to the natural orders, accounts of the natural orders, with analytical keys to the genera and species, and descriptions of the latter, and, finally, indices to the European, vernacular and botanical names.

Even with the great aid of Sir Joseph Hooker's "Flora of British India" and Sir Dietrich Brandis's "Forest Flora of the North-West Province," it was no light undertaking to prepare a pocket-flora containing the required information. The author may, however, be congratulated upon his execution of the task.

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The greatest difficulty in compiling this work was, doubtless, to select the subject-matter in such a manner as to keep the book small in size, yet devoid of vagueness. The author has elected to give rather full descriptions of the species, even including their vernacular names, habitats, habits, timber structure, uses, times of flowering, fruiting and leaf-shedding. The compression, and hence uncertainty, has therefore fallen upon the steps leading to the determination of the species, and particularly upon the glossary and analytical keys. The result is that the work, though extremely useful as a pocket reminder and aid to students (for whom it is intended), and for others possessing other guides, could not be easily employed by a novice or amateur for the determination of species.

The glossary, in addition to being somewhat too compressed, is occasionally somewhat obsolete, so that some of the definitions, for instance "cone," "endosperm," "lenticel," "moniliform," "prickle," "symmetrical," are scarcely satisfactory. The term "gregarious," though frequently used in the book, is not explained. In regard to this term, its continued use in botanical works is somewhat unfortunate when the more accurate term "social" is available.

The very compressed table showing the general scheme of classification is disfigured by one unnecessary and serious error; it divides flowering plants into Monocotyledons and Dicotyledons, and the latter again into Angiosperms and Gymnosperms!

In the key to the natural orders, the diagnostic characters given evidently refer in particular to the representatives in the flora described; for instance, the features given in reference to the Dipterocarpaceæ are, that they belong to the Polypetalæ, Thalamifloræ, and possess a valvate, irregular calyx adnate to the ovary and enlarged in the fruit; again, the Tiliaceæ are distinguished from the Sterculiaceæ by the free condition of their calyx. It is in this analytical table that some additions would be especially useful, especially such as facilitate identification in the absence of fruits.

Similar additions might be made in the analytical keys to genera and species. To take a specific case, the seven genera of Coniferæ—*Taxus*, *Cupressus*, *Juniperus*, *Pinus*, *Cedrus*, *Picea*, *Abies*—are distinguished from one another in this book primarily by the structure of their fruits. A novice having a specimen without fruits consequently could not take the first step towards identifying his plant. Yet it is very easy to give a brief key showing how to distinguish these seven genera by the arrangement and form of their leaves. In this particular instance, too, an especially good observer might well be puzzled by the distinction in the analytical key between *Picea* and *Abies*, the leaves of the former being described as acicular and multifarious, whilst those of the latter are said to be flat and bifarious.

As regards the get-up and printing of the book, great carelessness has been exhibited in the printing and possibly in the revision of proof; ugly curved lines of words and displaced letters occur, but misprints abound in glossary, tables, text, and in names of all kinds.

The defects of the book, therefore, are for the most part minor or matters of opinion, whereas its merits are great; and, as Mr. Gamble writes, "I am confident

that . . . this Flora will prove valuable to many successive classes of forest students and many successive forest officers whose duties may call them to the beautiful forests of the Dún and the splendid scenery of the adjoining Himalayan Mountains."

THE LAWS OF GEOGRAPHY.

Les Lois de la Géographie. 1er. Étude. Par Carlos de Mello. Pp. viii + 360. (Berlin: R. Friedländer und Sohn, 1902.) Price 10 marks.

SENHOR CARLOS DE MELLO, professor of geography at San Paulo, wields the pen of a ready and fearless writer, for he prefaces his volume of 360 pages on the laws of geography with the statement that it was written in two months, and the regret that it is consequently neither so clear nor so full as it might otherwise have been. "A short bibliography," he says, "concludes the work"; but since the bibliography occupies 224 pp. and the rest of the work only 136, we are inclined to think that the fact could be better expressed otherwise. Dedicated in Portuguese, written in French, printed and published in Germany, it is evident that the "laws of geography" are superior to the trammels of nationality or language. We were, in fact, unfavourably impressed by the preface, and it required some effort to approach the text with an open mind. On reading the chapters it soon became apparent that, however hastily the book was written, its preparation had required and had received years of thought, and study and wide reading. Even in the minor details of correct transcription of foreign names and the titles of publications, quite exceptional care must have been taken, for we have rarely seen a book so full of detail equally free from typographical errors.

The first of the "laws of geography" to be discussed is the law of asymmetry. It is pointed out how rarely parallelism is found in the larger features of the globe, how invariably (except in the case of Africa) a continent occupies a non-central position on its continental block, and how the relief of the continent itself displays a conspicuous dissymmetry, as in the position of the great plateaus of America. From this principle a series of laws of contrasts and harmonies is deduced with much ingenuity and confirmed to a considerable extent by the citation of examples. But even by the device of adopting asymmetry instead of symmetry as the standard of reference, it is impossible to avoid exceptions and contradictions. For example, in the "law of contrasts" which declares that the northern continents extend in the direction of the parallels and the southern continents in the direction of the meridians, the anomalous case of Australia is passed over without remark. We cannot help feeling that the author may possibly hold too precise and mathematical a view of symmetry in regard to the great features of the Earth's crust. It seems to us that broad features should be looked at broadly, and that on doing so the Earth's surface exhibits a rough symmetry in the alternation of height and hollow and the interlocking of ocean and continent. To a closer view, of course, the roughness appears more remarkable than the symmetry, but we have a suspicion that the symmetry is there as a

dominant fact and the asymmetry only as a detail. We are by no means sure, however, that the author has not started with the idea of the symmetry of terrestrial features as self-evident, and therefore devotes his whole attention to the rectification of the broad principle in details.

Part ii. deals with the laws of mutual dependence of terrestrial forms, and considers the cases of the relation of rivers to valleys and of continents to oceans. It presents a number of relationships arrived at by many authors whose works were often separated by considerable intervals of time. Some of these have been accepted and incorporated in current views, others have been passed over and forgotten. We have not space to refer critically to these, or to inquire how far they agree with or contradict the recent systematic discussion of the relation of rivers to their valleys which has culminated in the geographical cycle of Prof. Davis; but we cannot let pass the opportunity of reviewing this thoughtful summary of a part of geographical theory without inquiring why it is that so much of the work of geographical theorists has passed unproductively into oblivion. The reason may perhaps be that an original mind devoted to purely geographical questions has only arisen at long intervals; the work of the predecessor has been forgotten or absorbed as a detail in other sciences before the successor has made himself heard. It may be that this is due to the absence from geography of the numerous less original workers who are attracted to the study of other sciences by prospects of gain, and, while unable to advance the science themselves, at least hand on the torch without extinction.

Whether this be so or not, the fact is beyond dispute that geography has not made the progress that it should have done; and, more particularly in this country, the geographer as such is scarcely recognised. Geographical questions have so frequently been treated as incidents in the course of geological, botanical, zoological or historical investigations that even the scientific world hesitates to accept geography as a subject deserving of the whole attention of a competent man. There are signs of improvement in this respect, it is true, and any improvement is matter for satisfaction. There is room for many books of the type of Prof. de Mello's, and it would be well if such books commanded many readers. The sympathetic attitude of the ancient universities to geography is a gratifying and hopeful circumstance, almost compensating for the inadequate or even retrograde steps of the newer academic centres.

H. R. M.

OUR BOOK SHELF.

The Elements of Electrical Engineering. A First Year's Course for Students. By Tyson Sewell, A.I.E.E. Pp. xi + 332. (London: Crosby Lockwood and Son, 1902.) Price 7s. 6d. net.

THIS book, which is based upon courses of lectures delivered by the author, is primarily designed for students attending evening or other courses at the polytechnics. The course of lectures is more or less complete in itself, the necessary elementary theory being by no means neglected; the author, indeed, advises students to take a concurrent course in the scientific side of the subject, but such as are unfortunately unable to spare the necessary time will not, we think, find much in this book